WHAT IS CLAIMED IS:

1. An optical unit used in a projection type image display apparatus, the optical unit comprising:

a first optical element formed of a glass material, the first optical element performing at least one of color separation and color combination;

a holding member attached to the first optical element; and

a second optical element held by the holding member, the second optical element being formed of a resin material and acting optically one of incident light onto the first optical element and emergent light from the first optical element;

wherein the following condition is satisfied:

$$a1 < a3 \leqq a2$$

where a1, a2, and a3 represent linear expansion coefficients of the materials forming the first optical element, the second optical element, and the holding member, respectively.

2. The optical unit according to Claim 1, wherein the a3 is closer to the a2 than to the a1.

3. The optical unit according to Claim 1, wherein a gap

for passage of cooling air is formed between the first optical element and the second optical element.

4. The optical unit according to Claim 1, wherein the second optical element is a wavelength-selective polarization rotating element.

5. An optical unit used in a projection type image display apparatus, the optical unit comprising:

a first optical element which performs at least one of color separation and color combination of light;

a holding member attached to the first optical element; and

a second optical element held by the holding member, the second optical element acting optically one of incident on light onto the first optical element and emergent light from the first optical element,

wherein the holding member includes a holding structure holding the second optical element, the holding structure preventing the displacement of the second optical element in an optical axis direction of the first optical element which passes through the second optical element and allowing the displacement of the second optical element in a direction orthogonal to the optical axis direction.

6. The optical unit according to Claim 5, wherein the second optical element is held by the holding member by means of an adhesive agent,

the hardness after curing of the adhesive agent being less than the hardness of the material of the second optical element.

7. The optical unit according to Claim 5, wherein the first optical element is formed of glass and the second optical element is formed of resin.

8. The optical unit according to Claim 5, wherein the holding member is attached to the first optical element by an adhesive agent,

the hardness after curing of the adhesive agent being less than the hardness of the material of the holding member.

9. The optical unit according to Claim 5, wherein a gap for passage of cooling air is formed between the first optical element and the second optical element.

10. The optical unit according to Claim 5, wherein the second optical element is a wavelength-selective polarization rotating element.

11. A projection type image display apparatus comprising:

a plurality of image forming elements, each forming an original image;

a projection lens; and

an optical system which comprises the optical unit according to Claim 1 and guides the light from the plurality of image forming elements to the projection lens.

12. A projection type image display apparatus comprising:

a plurality of image forming elements, each forming an original image;

a projection lens; and

an optical system which comprises the optical unit according to Claim 5 and guides light from the plurality of image forming elements to the projection lens.

13. An optical system used in a projection type image display apparatus, comprising:

a first optical element which has a first linear expansion coefficient, the first optical element performing at least one of color separation and color combination of light;

a second optical element which has a second linear expansion coefficient, the second optical element acting optically on one of incident light onto the first optical

element and emergent light from the first optical element; and

a holding member which has a third linear expansion coefficient, the holding member holding the second optical element with respect to the first optical element;

wherein the third linear expansion coefficient is one of a coefficient which is substantially the same as the second linear expansion coefficient and a coefficient which is closer to the second linear expansion coefficient than to the first linear expansion coefficient.

14. The optical system according to Claim 13, wherein the first optical element is held by the holding member by means of a first adhesive agent, the hardness after curing of the first adhesive agent being less than the hardness of the material of the holding member, and

the second optical element is held by the holding member by means of a second adhesive agent, the hardness after curing of the second adhesive agent being less than the hardness of the material of the second optical element.

15. The optical system according to Claim 13, wherein the second optical element is attached to the holding member by an adhesive agent, the adhesive agent being disposed at two locations between the second optical element and the holding

member, and the hardness after curing of the adhesive agent being less than the hardness of the material of the second optical element.

16. The optical system according to Claim 13, wherein the first optical element is a prism type polarization beam splitter and

the second optical element is an element made by attaching one of a wavelength-selective polarization rotating element and a wave plate to a transparent substrate.

17. The optical system according to Claim 13, wherein the holding member holds the second optical element so that a spacing is formed between the second optical element and the first optical element, and has an air passage opening for blowing air to the spacing.

18. A projection type image display apparatus comprising:

a light source;

a plurality of image forming elements, each forming an original image;

a projection optical system; and

an optical system which comprises the optical system according to Claim 13 and guides light from the plurality of image forming elements to the projection optical system.

19. An optical system used in a projection type image display apparatus, comprising:

a first optical element which performs at least one of color separation and color combination of light;

a second optical element which acts optically on one of incident light onto the first optical element and emergent light from the first optical element; and

a holding member which holds the second optical element with respect to the first optical element,

wherein the holding member includes a supporting portion, which supports a first surface of the second optical element, and an elastic portion which presses a second surface, opposite the first surface, towards the side of the supporting portion.

20. A projection type image display apparatus comprising:

a light source;

a plurality of image forming elements, each forming an original image;

a projection optical system; and

an optical system which comprises the optical system according to Claim 19 and guides light from the plurality of image forming elements to the projection optical system.

21. An optical system comprising:

a color separation element which separates light into a first color light, a second color light and a third color light;

a color combining element which performs color combination of the first color light, the second color light and the third color light;

a first polarization beam splitter which guides the first color light from the color separation element to a first image forming element and guides the first color light from the first image forming element to the color combining element;

a second polarization beam splitter which guides the second color light from the color separation element to a second image forming element, guides the second color light from the second image forming element to the color combining element, guides the third color light from the color separation element to a third image forming element, and guides the third color light from the third image forming element to the color combining element;

a base which holds the color separation element, the color combining element, the first polarization beam splitter, and the second polarization beam splitter;

a first substrate which holds the first polarization beam splitter with respect to the color combining element;

and

a second substrate which holds the second polarization beam splitter with respect to the color combining element.

22. The optical system according to Claim 21, wherein the color combining element, the first polarization beam splitter and the second polarization beam splitter are glass prisms, and the first substrate and the second substrate are glass substrates.

23. A projection type image display apparatus comprising:

a light source;

a color separation element which separates light into a first color light, a second color light and a third color light;

a first image forming element, a second image forming element and a third image forming element;

a color combining element which performs color combination of the first color light, the second color light and the third color light;

a projection optical system which projects light from the color combining element;

a first polarization beam splitter which guides the first color light from the color separation element to the first image forming element and guides the first color light

from the first image forming element to the color combining element;

a second polarization beam splitter which guides the second color light from the color separation element to the second image forming element, guides the second color light from the second image forming element to the color combining element, guides the third color light from the color separation element to the third image forming element and guides the third color light from the third image forming element to the color combining element;

a base which holds the color separation element, the color combining element, the first polarization beam splitter and the second polarization beam splitter;

a first substrate which holds the first polarization beam splitter with respect to the color combining element; and

a second substrate which holds the second polarization beam splitter with respect to the color combining element.

24. The projection type image display apparatus according to Claim 23, wherein the first color light includes green light, the second color light includes red light, the third color light contains blue light, and

the first image forming element, the second image forming element and the third image forming element are

reflection type liquid crystal panels.